

CLAIMS

- 1 1. A method of determining how a region of a data structure in an application
- 2 evolves, comprising:
 - 3 periodically traversing selected subgraphs of the region in the running
 - 4 application;
 - 5 locating structural changes in the subgraphs; and
 - 6 using these structural changes to describe, characterize, and identify changes to
 - 7 the region as a whole.
- 1 2. The method of claim 1 further comprising reporting the region changes to an
- 2 analysis agent.
- 1 3. The method of claim 1 used to detect one of the following changes to a region:
 - 2 additions to a region; removals from a region; and internal restructuring within a
 - 3 region.
- 1 4. The method of claim 1 wherein the selected subgraphs to traverse are derived
- 2 by
 - 3 computing the region key for the constituents of the data structure; and
 - 4 identifying the unique set of paths from owner proxy to change proxy as the set
 - 5 of traversals.

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1 5. The method of claim 4 wherein the traversals are shortened by
2 identifying a subpath of the path which is unlikely to change as the region
3 evolves; and
4 trimming the path to exclude the parts of the path which are unlikely to change.

1 6. The method of claim 1 wherein determining how a region of a data structure in
2 an application evolves is a continuous and adaptive process.

1 7. The method of claim 6 wherein the process is made continuous and adaptive
2 by
3 identifying a set of desired updates; and
4 adjusting the period in between traversals based on whether the desired updates
5 have been witnessed.

1 8. The method of claim 6 wherein the process is made continuous and adaptive
2 by
3 identifying a set of desired updates; and
4 adjusting the frequency of sampling any one traversal based on whether that
5 traversal has detected desired updates.

1 9. The method of claim 6 wherein the process is made continuous and adaptive
2 by implementing one of the following procedures based on the result of performing a
3 traversal: adding new traversals; removing existing traversals; and modifying the path
4 of existing traversals.

1 10. The method of claim 1 further comprising
2 updating qualitative characterizations of the regions under analysis based on
3 structural changes to the regions as a whole..

1 11. The method of claim 1 further comprising
2 updating quantitative characterizations of the regions under analysis based on
3 structural changes to the regions as a whole.

1 12. A computer readable medium for determining how a region of a data structure
2 in an application evolves, comprising instructions for:
3 periodically traversing selected subgraphs of the region in the running
4 application;
5 locating structural changes in the subgraphs; and
6 using these structural changes to describe, characterize, and identify changes to
7 the region as a whole.

1 13. An information processing system comprising:
2 a processor comprising logic for performing instructions of:
3 periodically traversing selected subgraphs of the region in the running
4 application;
5 locating structural changes in the subgraphs; and
6 using these structural changes to describe, characterize, and identify
7 changes to the region as a whole; and
8 a memory for storing the instructions.